

What Is Claimed Is:

1. A method of manufacturing a semiconductor device comprising:
 - forming a multi-layered insulating structure on a semiconductor substrate;
 - forming an opening in the insulating structure to expose a field region of the semiconductor substrate;
 - forming a trench in the field region of the semiconductor substrate;
 - forming a groove on an edge portion of an intermediate layer of the multi-layered insulating structure;
 - depositing a liner insulating layer in a desired thickness on a surface of the multi-layered insulating structure; and
 - filling the groove and the trench with an oxide layer.
2. A method as defined in claim 1 wherein depositing the liner insulating layer comprises depositing the liner insulating layer along the groove and the trench.
3. A method as defined in claim 1, wherein the liner insulating layer is formed of a liner oxide layer.
4. A method as defined in claim 3, wherein the liner oxide layer is deposited by an atomic layer deposition (ALD) process.

5. A method as defined in claim 4, wherein the liner oxide layer is deposited in a thickness of approximately 100 to 300 Å.

6. A method as defined in claim 5, wherein the liner oxide layer is deposited at a temperature of approximately 250 to 350 °C.

7. A method as defined in claim 1, wherein the multi-layered insulating structure comprises an upper oxide layer, an intermediate nitride layer and a lower oxide layer.